FOREST RENEWAL BC
RESOURCES INVENTORY PROGRAM

Inventory Framework -
Program Review and Request for Fiscal Year 1999/00

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Introduction

This document presents a review of the framework initiative, including highlights of accomplishments to date, and program completion through fiscal 01/02. Some examples of how the framework initiative has contributed to Forest Renewal achievements are:

- Results from a 3-year field survey on productivity of second growth forests point to an increase in the estimate of the productivity of these new forests. In all cases, the new forests mature sooner than expected, with more volume available to harvest at a younger age. This new information may lead to possible changes in allowable forest harvesting, with increases in some areas, or smaller declines in others. This could translate into increased short- and/or long-term forest harvests, with the associated benefits to industry and community stability.
- Improved data on rare and endangered species, managed through the Framework-funded Conservation Data Centre, is increasing resource manager's confidence as field inventories show some species are more abundant than previously thought, and, where species are rare, their habitat needs are more clearly defined. This allows decision-makers to process permits faster and to be less conservative in managing these resources. Standards development for species inventory has been an important part of the Framework Program.

The Forest Renewal BC 1998/99 Business Plan outlines a corporate strategic framework which identifies challenges the organization must respond to if it is to succeed in delivering on its mandate. Included in the list of challenges is: "**Quality of Information** - Better forest management and decision making require much more and better information about our forest resources, and about the impacts of various practices and processes." The strategic objectives the corporation intends to focus on over a five-year planning horizon include "enhancing our knowledge of the forest", wherein Forest Renewal "will invest in resource inventory to allow more-informed forest management decisions and research that will provide a sound basis for changes in practices, processes and regulations".

In preparing the Inventory Framework program review and request for fiscal 99/00, the stated objectives of Forest Renewal BC were taken into account, along with the recognition that the organization faces emerging challenges. Refinements are being made to the strategic objectives, with the one most relevant to resources inventory activities being the need to "strengthen sustainable forest management". This will involve "enhancing resources management planning and evaluation ... by using new tools and information ..." and focusing on "providing support for better decision-making and stronger linkages in higher level forest management planning".

The Framework Program will continue to deliver on Forest Renewal objectives which support the gathering and sharing of better inventory information needed to improve our forest management practices, and ensure ecosystem integrity is protected. While the Program has been responsive to the evolving priorities of the corporation, the plan for the next year, and beyond, focuses on protecting the investment made to date in support of long-term management of field inventory data. The Program addresses

strategic inventory requirements by planning for, and undertaking projects aimed at minimizing the need to collect field inventory data, and where data acquisition is called for, to provide the tools to complete this work in a cost effective manner.

Program Mandate

The Forest Renewal BC Resources Inventory Program was established in 1995 as a major initiative aimed at increasing the quantity and improving the quality of resources inventory information. The need for inventory information was recognized prior to the introduction of the Forest Practices Code and the Forest Renewal Act, and as a requirement in the management of the lands and resources of B.C.

In April 1995, Forest Renewal BC approved $25 million in inventory expenditures for fiscal 1995/96. Concurrent with that approval was initiation of the development of a 5-year business plan for the Inventory Framework Subprogram. The 5-year Inventory Framework Business Plan was approved by the Forest Renewal Board of Directors in February 1996. Additional approvals were granted in May of 1996 for projects which were moved into the Framework at the request of Forest Renewal BC. Subsequent Framework program reviews were completed in February 1997 and December 1997 with presentations to the Inventory Committee of the Forest Renewal BC Board of Directors.

In the original guiding principles for the Forest Renewal BC Resources Inventory Program (May 1995), it was noted that inventory information collected under the Forest Renewal BC Resources Inventory Program "...must be collected to the appropriate standards, stored in a database that is consistent with those standards, and easily accessible by proponents". With that intent, the Inventory Framework projects were designed to provide the infrastructure needed to support field inventories to be conducted by Forest Renewal partners, and to provide access to existing inventory data.

The Framework projects include base mapping (to provide a consistent mapping foundation), data conversion (for data sharing and to avoid duplication of effort), database development (for standardized access and integration), and standards, procedures and curriculum development (to ensure consistency in data collection activities).

In addition, the Framework initiative includes provincial program strategies wherein centralization of some projects takes advantage of limited expert resources in certain areas of specialization, duplication of effort is avoided, and tools are developed in a more cost-effective manner. Provincial program strategies are aimed at determining the minimum requirements to meet province-wide objectives (e.g., through the Forest Productivity Council matrices for various growth and yield applications). A provincial approach is needed to develop strategies which are client-driven; to determine what products are best suited to solving problems; and to ensure that data are collected for the right reasons in the right places, and for use in the products developed to solve problems.

The Framework Inventory Program has been undertaken collaboratively by the partner ministries led by the Ministries of Environment, Lands and Parks (MELP) and Forests

(MoF), together with the Ministry of Fisheries, the Ministry of Energy and Mines, the Ministry of Small Business, Tourism and Culture, and the Ministry of Agriculture and Food. The priorities have always focused on addressing inventory issues where these: fit with Forest Renewal BC provincial priorities; meet needs identified in regional business plans that reflect community needs, and; are in areas where inventories are of low quality or are non-existent.

Framework Program in Review

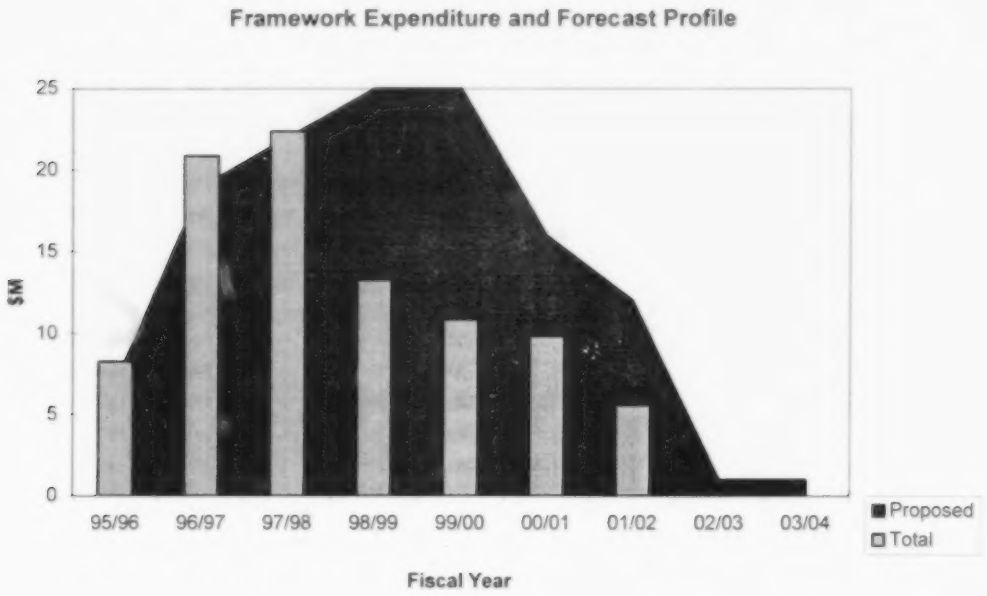
The Inventory Framework Program has been making steady progress toward the original program objectives with the completion of numerous projects and significant return on investment. Some noteworthy accomplishments include:

- TRIM (Terrain Resource Information Management) base mapping completed at 1:20,000 scale for the province providing a foundation for many inventories;
- conversion of existing Archaeological Overview Assessment data to a useful level of detail from earlier LRMP data projects;
- provincial parks data loaded to fill in significant forest cover gaps and support forest resource management across the entire forest land base;
- rare and endangered species data managed through the Conservation Data Centre are now available to confirm the level of conservation required;
- recreation data model available to support management of data on Visual Quality Objectives, Recreation Opportunities Spectrum;
- terrain, terrain stability and mineral occurrence data now available on the web to support ongoing field inventory activities;
- soils information from sources going back a number of decades now accessible ;
- water information sharing project (WINS) now provides access to water data for external clients;
- OGSI (old growth site index) project produced data supporting significant potential to alter allowable annual cut increases in some circumstances;
- growth and yield monitoring points to upward revisions in volume and decay estimates;
- adaptation of the mixed wood growth model for use in B.C. should increase confidence in predicting future harvesting profiles which will greatly assist industrial investment decision in product conversion infrastructure;
- critical curriculum development in support of inventories for Culturally Modified Trees (CMTs) considered of great importance in relationships with First Nations;
- 19,000 survey cards from extensive stream surveys undertaken in the 1970's have been scanned and located from 512 Aquatic Biophysical Maps;
- completed the basic components of the Field Data Information Systems for the capture, storage and retrieval of reach, site, lake and fish data from 1:20,000 Reconnaissance surveys.

The February 1997 program review proposed an expenditure scenario which aimed at achieving the program objectives in as timely a manner as possible. Changing priorities and fiscal constraints have seen significant reductions in the actual expenditures. The proposed and actual (i.e., expenditures and forecasts) funding profiles are shown in Figure 1 below. These profiles reflect the changes in priorities as well as fiscal

constraints which resulted in expenditure reductions in some cases, and reprofiled expenditures over longer time periods for some projects.

Figure 1. Framework Expenditure and Forecast Profile



Appendix A summarizes the program funding through Fiscal 2001/02. Details on the work remaining to complete the Framework initiative are provided in the project descriptions in Appendix B. Finally, Appendix C includes brief summaries of the individual projects which have already been completed under the Framework Program.

The funding outlined for the Framework Program for Fiscal 1999/2000 through Fiscal 2001/2002 reflects adjustments to individual project funding levels to fit within the total Framework funding ($10.855 million) identified in the Forest Renewal BC Land-based Programs Investment Targets for Fiscal 1999/2000. The amounts identified for each project are subject to change, pending the final results of expenditures in fiscal 1998/99.

Additional funding reductions will further impact the completion of program deliverables in the most cost-effective manner as project work will be drawn out over a longer period of time, with extension of the associated overhead costs. Delays or failure to complete Framework projects will impede the success of Forest Renewal-funded field inventory activities, and will compromise the strategic objective of enhancing sustainable forest management as information is needed as "support for better decision-making and stronger linkages in higher level forest management planning".

Appendix A - Framework Program Summary

Appendix B - Project Details

DATA CAPTURE AND CONVERSION

Forest Inventory NAD Conversion (99140)

Project Summary
In 1990 Canada and British Columbia announced the adoption of the North American Datum 1983 (NAD83) and to ensure that British Columbia remains current various government map bases needed to be converted. Currently, many of the 7,024 Ministry of Forests' 1:20,000 scale forest cover maps are referenced to NAD 27. Approximately 900 forest cover maps are already on TRIM/NAD 83; 4,400 require NAD conversion onto NAD 83 and the remaining 1,724 are either under reinventory or they are within TFL or non-typed Park areas. Moving to the TRIM/NAD 83 base map will align the forest inventory with the provincial standard.

Remaining goals:
- Convert remaining 1354 mapsheets to NAD83

Scheduled Completion: March 2000

Forest Atlas Conversion to NAD 83 (99190)

Project Summary
The Forest Atlas is the legal representation of all rights issued under the Forest and Range Acts. It is the vehicle by which timber is sold in the province and also forms the basis for determining compliance of harvesting authorities with the legislation. It is critical in ensuring that harvesting activities authorized by the Ministry of Forests do not conflict with other rights issued by other ministries.

Several initiatives aimed at expediting cutting authority issuance for the forest industry are dependent on a digital NAD 83 forest atlas. Once all ministry mapping has moved to NAD 83 it will be a critical tool in linking inventory to development plans to harvesting authority. The atlas will also be vital in resolving discrepancies between the ministry and industry on major boundaries such as TFL boundaries.

Remaining goals:
- Complete 3 remaining forest districts.

Scheduled Completion: March 2000

Recreation Inventory Data Conversion (99200)

Project Summary
This project will deliver provincial coverage of recreation feature, visual landscape and recreation opportunity spectrum graphic and attribute data as separate layers of information on BCGS mapsheets in NAD 83 format.

This project is part of the larger Recreation Resources Inventory Project. The purpose of the overall project is to develop and implement standards, management processes and operational practices to provide and maintain an accessible, accurate recreation resources inventory for all the lands of the province.

Remaining goals:
- Finish 33 districts to 1996 standards
- Merge missing TFL data
- Convert to INCOSADA for multi user access

Scheduled Completion: March 2001

Digital Terrain Stability (99210)

Project Summary
The Digital Terrain Stability project is responsible for the establishment of a digital map library consisting of terrain and terrain stability maps either already existing or produced by the Field Inventory Program. The library will be accessible to the forest industry, government and the public through the World Wide Web, initially at no cost to the users. Terrain and terrain stability maps produced through the Field Inventory Program will be provided to the project in digital format by the mappers for inclusion. Existing paper maps with valuable terrain and terrain stability information will be converted to digital format by industry contractors. In addition, existing digital information about mineral occurrences in the province will be converted from NAD 27 to NAD 83. The digital terrain stability map library will provide an accessible source of existing mapping to provide background data for detailed studies and in some cases will provide the information needed to facilitate an approval decision. The industry will realize efficiencies through time savings and elimination of duplication. The information is also available to users outside the forest industry and has relevance in a broad spectrum of endeavors.

Remaining goals:
- Digital terrain map library
- Conversion of remaining hardcopy maps to digital format

Scheduled Completion: March 2000

Soils Data Conversion (99220)

Project Summary
This project will provide a management 'mechanism' for providing soils information in a manner that will enable better and responsible management of our provincial resources.

There is a growing need for soils data to support resources planning and management particularly under initiatives like LRMP, LRUPS and 'Growth Strategies'. The problem is that most of the soils data that exists is in mixed formats, incomplete, inaccessible and inaccurate. Consequently, resource managers are unable to make informed decisions on the land base, or are forced to carry out new soil data capture exercises which are costly and time consuming.

Remaining goals:
- Convert remaining paper copy maps to digital format

Scheduled Completion: March 2000

Enhanced Cadastre (99650)

Project Summary
Digital cadastral mapping shows the legal survey base for the province. It is essential in determining the location and extent of land ownership and other interests in land. This project also includes conversion of Crown land survey plans and grants of property to digital form for electronic distribution throughout the province. This project has been extended to include the Parks digital protected area boundary into the CDMS.

Remaining goals:
- To complete the scanning of crown grants, plans and field notes
- Complete the reconciliation of park boundaries
- Generate park regulation plans for amended parks

Scheduled Completion: March 2001

Fisheries Data Conversion (99620)

Project Summary
A large quantity of lake, stream and fish species field inventory data (landscape and operational) spanning 40 years exists in various provincial and federal agency offices as paper files. This information is more detailed than is being compiled for the Fisheries Information Summary System (FISS) and needs to be compiled and entered into a computerized database system to allow rapid and effective access and analysis. Compiling this data will also assist with the identification of data gaps and allow for more effective planning of inventory activities. Some of the electronic data may be loaded into the Field Data Information System (FDIS) to provide a single source of comparable field data about lakes, streams and fish.

Remaining goals:
- Finish RAB card conversion
- Continue conversion of paper Bathymetry maps to raster images
- Continue entry of lake surveys

Scheduled Completion: March 2002

Fisheries Information Summary System (FISS) (99610)

Project Summary
FISS provides a standardized, systematic summary of information about fish, fish habitat and resource use (fishing). FISS is digital and fully georeferenced, using the Ministry of Environment, Lands and Parks Watershed Atlas and unique waterbody identifiers. FISS may include information about all waterbodies (lakes and streams) and all species of fish. Major components of FISS include a compilation of existing fish and fish habitat data, including a summary of species and stock characteristics, known distribution and references, and 1:50,000 map-based classification.

Remaining goals:
- Complete fish distribution mapping
- Update database with new information
- Generate new theme maps
- Initiate summarization of FDIS to FISS

Scheduled Completion: March 2002

Wildlife Data Capture/Conversion (99600)

Project Summary
This project will capture remaining existing information regarding wildlife species and habitats, update existing data sets to NAD 83 and TRIM standards, and develop interpretations for planning purposes. Lack of good specific information may result in overly-conservative management requirements, repetition of unnecessary inventory, delays in planning, and possibly, bad ecological decisions. This project will continue to work with three new groups of biodiversity: invertebrates, plants, and rare ecosystems. Several data sets of importance to wildlife habitats, as well as older habitat maps, will be converted to modern standards.

Remaining goals:
- Conversion of the 97/98 TEM and wildlife mapping
- Capture and conversion of the pre 97 TEM maps
- Capture of ecological sample plots
- Conversion of more sets of RBCM plant and animal records

Scheduled Completion: March 2000

TRIM Watershed Atlas (99670)

Project Summary
The goals of the TRIM Watershed Atlas project (TWA) are to produce a 1:20,000 version of the existing 1:50,000 Watershed Atlas using TRIM linework and an associated set of Heights of Land (HOL), and secondly, as an interim measure until this base (TWA) is available, to generate unique waterbody identifiers for streams and lakes inventoried through field inventories, and which are not already present in the 1:50,000 Watershed Atlas.

Procedures for migrating Watershed Atlas functionality to the TRIM data set have been developed and tested, with refinements in progress. HOL have been generated for parts of the Province, with processing underway on the remainder. Approximately 100,000 additional waterbody identifiers have been generated to date.

Remaining goals:
- Capture new stream identifiers not currently in the 1:50,000 Watershed Atlas
- Build 150 watershed groups

Scheduled Completion: March 2002

Hydrometric Data Conversion (99520)

Project Summary
The goal of this project is to compile existing hydrometric, climatic, and snow data for populating the database currently being developed. The project makes use of needs analyses conducted in regions to identify existing data gaps, and an inventory of data compiled during the development of the business requirements of the database. Capture and conversion of existing data will enable the timely development of forestry-specific water quality objectives and provide the data needed by the forest industry to optimize road, bridge and culvert design.

Remaining goals:
- Initiate data conversion into new database

Scheduled Completion: March 2001

DATABASE DEVELOPMENT

Vegetation Resources Inventory Database Development (99230)

Project Summary
The purpose of the vegetation database system is to make improvements to the Ministry of Forests' land data resources. When it is completed, the ministry will have an integrated, standardized database containing attribute and spatial data on forest tenures, silvicultural activity, infrastructure, and vegetation inventory. In addition, linkages via LandData BC will be established with data sources from other government and private sector agencies to provide and receive any other data required for planning purposes.

Emphasis will be placed of the Vegetation Resources Inventory as it is the largest and oldest spatial and attribute database in the province and requires significant technical improvements. To this end, all current and future corporate spatial and attribute database initiatives will be conducted in close consultation and cooperation towards the common goal of an integrated Corporate Relational and Spatial Database.

Remaining goals:
- Complete the provincial data conversion and implementation of the new tool set
- Enhance capture tools to streamline consolidated data capture

Scheduled Completion: March 2000

Growth & Yield Reporting System Development (99360)

Project Summary
The Growth & Yield Reporting System (GYRS) compiles and reports on all sample data for the Growth & Yield and Vegetation Inventory plots. Data extracted from the corporate Growth & Yield database (GTDB) are completed, compiled, reported and downloaded to clients by GYRS. This project will accelerate the availability of inventory data which is either required or assumed to be available to meet strategic and operational planning requirements by: providing enhanced sample analysis and reporting capability; ensuring application software supports the corporate application framework; providing users with advanced sample processing capability; and creating documentation containing the most up-to-date derived data specifications.

Remaining goals:
- Build audit compiler
- Complete and update VRI compiler
- Enhance NVAF compiler
- Build common utilities library
- Build EPSL data transfer facility

Scheduled Completion: March 2002

Water Quality Database Development (99470)

Project Summary:
To develop and implement a database to compile and analyze data collected from automated water quality stations. The integrated Water Quality Database will allow the capture, processing and interpretation of large volumes of spatial, physical and biological water resource data before,

during and following a variety of forest and range use activities. In addition to being the central component in the development of a provincial water resources inventory, the database system will be linked to a Geographical Information System (GIS) and to planning platforms so that forestry operations can be planned, monitored and managed in order to protect water resources.

Remaining goals:
- Complete web access and data warehousing
- Integrate with the Hydrologic database

Scheduled Completion: March 2000

Fisheries Database Development (99480)

Project Summary
The Fisheries Database Development Project encompasses both the completion and acceleration of the existing initiatives, and the development of new databases. All the components will support the storage, analysis and reporting of fish and fish habitat inventory data at the summary, landscape and operational levels.

Specifically, the five components are: 1) Fisheries Data Warehouse; 2) Fisheries Information Summary System; 3) Field Data Information System; 4) Scientific Collection Permit System; and 5) Species-based Database.

Remaining goals:
- Incorporate 1999 standards into FDIS
- Reporting and quality assurance assessments
- Public access

Scheduled Completion: March 2001

Wildlife Database Development (99530)

Project Summary
The objectives of this project are to develop a suite of systems tools to permit the management of FRBC funded ecosystem mapping and wildlife species inventory projects. In order to achieve this objective, the following are required: standards, disconnected data capture applications, data systems and an Internet site. During 1996/97, approximately $20 million worth of TEM and $11 million worth of species inventories were approved by FRBC. Without technical standards, data capture applications and systems to manage the capture, delivery and analysis of this information, the province will not be able to effectively utilize the data sets.

Remaining goals:
- Completion of database systems for SPI, TEM, Wildlife Habitat, DEIF and BEI

Scheduled Completion: March 2001

Hydrologic Database Development (99490)

Project Summary
To develop a Water Quality Database which would allow hydrometric, climatic and snow data at automated sites to be collected and quality assured. The integrated system will allow the capture,

processing and interpretation of large volumes of spatial, physical and biological water resource data before, during and following a variety of forest and range use activities. It will be linked to a Geographical Information system (GIS) and to planning platforms so that forestry operations can be planned, monitored and managed in order to protect water resources.

Remaining goals:
- Complete development and implementation

Scheduled Completion: March 2001

CDC Rare/Endangered Species Database Development (99450)

Project Summary:
This project will allow the Conservation Data Centre to continue expanding its database capabilities for digitizing mapped data, creating new map products, and electronic dissemination of key information.
Delivery of this project will improve the Conservation Data Centre's ability to respond to the greatly increased work load caused by FRBC client requests and incoming new data. It will also focus on processing new information to permit rapid Wildlife Habitat Area (WHA) recommendations based on adequate information. This mapping capability and fast access are essential in order to deliver information quickly to regional and district staff concerned with rare and endangered species/ecosystem information.

Remaining goals:

- Data registry
- Herb database integration
- Internet development
- Arcview GOAT

Scheduled Completion: March 2001

STANDARDS AND CURRICULUM DEVELOPMENT

RIC Curriculum Development (99250)

Project Summary
The need for rapid, consistent implementation of improved resource inventories has been intensified with the implementation of the Forest Practices Code and the Forest Renewal Program. The Resources Inventory Committee (RIC) Training Program exists to support the implementation of the approximately 130 resources inventory standards currently being developed. The goals of the RIC Training Program are as follows:

- To provide participants with the required skills and knowledge to properly conduct field inventories as dictated by the RIC Standards;
- To provide training that is directly applicable to the jobs that will be required in the field;
- to provide open access to training through community based delivery at a reasonable cost; and,
- To provide a training path for people to follow who are interested in pursuing a career in the resources inventory field.

Remaining goals:

- Finish projects underway in fiscal 98/99

Scheduled Completion: March 2000

Inventory Standards (99640)

Under the Resources Inventory Committee (RIC) inventory standards are being developed for all natural resources in the province. These standards are required to assure that consistent methods are used in the collection of data for mapping and inventory.

Fisheries Standards and Procedures Development

Project Summary
The purpose of this project is to develop standard methods and procedures for Fish and Fish Habitat Inventory for the province.

Remaining goals:

- Communicate inventory standards to users
- Review and update inventory standards
- Field test reconnaissance inventory in watershed
- Investigate integration with TSM and Watershed assessment and WRP fish habitat and riparian areas
- Investigate use of TRIM Watershed Atlas to automate and improve data

Scheduled Completion: March 2002

Wildlife Standards and Procedures Development

Project Summary
Under this project inventory manuals and accompanying documents are being developed for large (1:20,000 - 1:50,000) and small (1:250,000) scale terrestrial ecosystem mapping as well as for 41 different animal species groups. These manuals define the standards for collecting FRBC, CRII and CLIB-funded habitat/ecosystem and wildlife inventory data within British Columbia.

Remaining goals:
- Update Describing Ecosystems In the Field standard
- Revise TEM and PEM standards
- revise Wildlife Habitat standards

Scheduled Completion: March 2001

Water Quality Data Assessment Standard

Project Summary
The project outlines the need for, and the development of, protocols and standards for collecting water quality data and objective setting processes which consider the specific impacts of forestry as a land use activity. Since the initiation of this project, additional methods and standards have been identified that are required to effectively deliver this inventory program.

Remaining goals:
- Continue data collection and compilation for Data Assessment Standard
- Finalize RIC Hydrometric standard

Scheduled Completion: December 2001

Karst Inventory (99260)

Project Summary
Information on the location, extent, and nature of karst topography in B.C. is largely unavailable, except for parts of Vancouver Island, and at small scales for other parts of B.C. This project will develop and test karst inventory standards and methods for different scales and will allow better and quicker responses to user requests. Another of the goals of this project is to compile existing data and information on karst terrain in order to identify gaps in the data so that small scale and field inventories can be targeted on highest priority areas. Additional work will be targeted at mapping karst and karst vulnerability at small scales. This could be undertaken on a priority basis, or as a broad provincial initiative. Together, these activities will enable the development of forestry-specific karst management objectives and protection strategies for integration into land use and forest planning exercises. Lack of good information may result in overly conservative management requirements, repetition of unnecessary inventory, delays in planning, environmental degradation, and cultural losses. Currently, some forest management activities are being delayed in part because of insufficient inventory information.

Remaining goals:

- Revise vulnerability rating systems
- Conduct filed testing for 1:50,000 inventory methodology
- Pilot test 1:10,000 methodology

Scheduled Completion: March 2001

PROVINCIAL PROGRAM STRATEGIES

Site Productivity Projects (99320)

Project Summary
The Site Productivity Working Group (SPWG) is a joint government, industry and academic task force funded largely by Forest Renewal BC (FRBC). The SPWG developed a five year Site Index (Productivity) Estimation Program for 1996/97 to 2000/01 which is updated every year. The plan outlines a group of projects, consistent with the priorities of the Ministry of Forests' Growth and Yield Program and the Forest Productivity Council of BC, to develop site productivity estimation techniques that will provide the means to accurately estimate the productivity of any forest stand in BC. Activity areas include Site Index - Biogeoclimatic Ecosystem Classification correlations (SIBEC), site index and height-age model development, and techniques to determine site productivity of uneven aged and partially cut stands. Program deliverables will be used by industry and Ministry in forest management planning activities for timber supply areas and tree farm licenses.

Site productivity information is crucial for forest management planning, including timber supply analyses, determining allowable annual cut (AAC), and for formulating silviculture strategies. This project area will address the need to develop alternative methods for estimating site productivity. The percentage of forest stands in BC suitable for traditional site productivity estimation is unknown, but it is felt that it is less than 50%, and even as low as 15%. Estimating site productivity is difficult, and often underestimated, on existing old-growth stands, juvenile stands, uneven-aged stands, and on sites where there is no standing timber. This could impact the projections of future stand volumes and on management objectives such as cutblock adjacency and green-up.

Remaining goals:
- SIBEC sampling, training, analysis, database validation
- Height, age and growth index validation
- Growth index stem analysis, group height age curves
- Field judgment to improve database estimates
- Species conversion to new models
- Uneven aged sampling
- Year to breast height sampling

Scheduled Completion: March 2002

Growth and Yield Monitoring Program (99440)

Project Summary
The Growth and Yield Monitoring Program is required to provide an independent and statistically defensible check on growth and yield predictions and estimates produced from data analyses and G&Y models. It is used in inventory update, timber supply forecasting, silvicultural decision making and forest health assessment This data collection program compliments and validates the provincial G&Y Program for ministry and industrial users through increased confidence in the use of G&Y information with the added provision for localized prediction at the TSA/TFL management level. The G&Y Monitoring Program completes the third phase requirement for the Vegetation Resources Inventory in providing data for the assessment of changes in inventory over time. The Monitoring Program requires multi-agency participation in needs identification and development.

Program implementation and delivery has occurred through joint-industry/ministry regional cooperatives.

Remaining goals:
- Develop and field test operational monitoring protocols for V&D, stand growth, stand yield
- Integrate with NFI
- Integrate systems into modeling procedures
- Develop provincial monitoring strategies

Scheduled Completion: March 2002

Growth and Yield Inventory Prediction System (99350)

Project Summary
Over the next 10 years the province will be reclassified and statistically sampled to provide unbiased estimates of both timber and non-timber resources. This new inventory will enable the use of enhanced tree and stand based yield prediction models which will 1) augment the existing low resolution, photo-based inventory with more comprehensive continuous variables which will support the application of sophisticated growth and yield applications, 2) reduce current restrictions on the availability of stand characteristic parameters, and 3) address the lack of ecosystem information.

This project will deliver improved BEC-referenced models for tree and stand level growth and yield prediction through:
- developments in single tree and stand level volume prediction referenced to the provincial BEC system;
- new taper and decay prediction tools will be applied at the tree level during compilation to BEC-stratified PSP and TSP sample databases;
- revised growth and yield models will be refitted at gross levels of utilization; and
- new stand level decay and waste models will be developed to reduce gross level volume to net volume.

Remaining goals:
- Calibrate new provincial inventory model
- Develop architecture for model integration
- Enhance models with new data
- Integrate results from monitoring protocols

Scheduled Completion: March 2002

Growth and Yield Analysis and Decision Support Tools (99330)

Project Summary
The recently completed Timber Supply Review (TSR) identified a number of issues in the areas of inventory, growth and yield and data analysis that require investigation and resolution for future TSRs. These issues will be examined through a number of projects coordinated by several working groups. In addition, this project will assist in the development of new decision support tools that are directed to support the Timber Supply Review process.

Determination of allowable annual cut (AAC) is very important because of the huge impact timber utilization has on social, environmental and economic values. Timber supply analysis in the Timber Supply Review is a key technical step in the determination of AAC. While the current

procedures for these timber supply analyses represent a great technical improvement for the Ministry over earlier methods, they can and should still be improved.

Remaining goals:
- Completion of GY data analysis
- Completion of GY EP database

Scheduled Completion: March 2000

Growth & Yield Permanent Sample Plot Capture Project (99300)

Project Summary
The development of Permanent Sample Plot (PSP) databases that support growth and yield analysis and model development are a major priority of the Forest productivity Council of B.C. (Council). The Provincial PSP program is directed to achieve this goal through a program of sample establishment and remeasurement of operational G&Y plots in accordance with plans, standards and criteria developed by the Council. Matrices for natural and treated stands are used by the ministry and industry to identify the range and number of samples required by species, geographical areas, and treatment, for both immature and mature stand conditions. The Provincial PSP program is delivered largely by the ministry at the regional level and by a few Tree Farm Licensees. Over the next few years, the Provincial PSP program will expand greatly through the formation of joint industry-ministry regional cooperatives. Access to PSP data is governed through policy developed by the Council and endorsed by the ministry.

PSP data will better enable decision makers to enhance the productive capacity of forest lands by supporting the need for enhanced G&Y information for research, inventory, silviculture and forest health applications. This program will also increase investment in the forest resource and the forest land base by providing data for the development of essential G&Y applications that support the corporate needs of the ministry and industry for forest planning and management. PSP data can be used for the development of applications that provide G&Y information at the management unit level or can be localized to the landscape or watershed unit level.

Remaining goals:
- Annual update of PSP databases
- New algorithms, revise standards, revise field procedures
- Enhance provincial PSP strategies
- Quality assurance and data processing

Scheduled Completion: March 2002

Adaptation of Prognosis (99340)

Project Summary
Prognosis BC will provide forestry professionals in government, industry, consulting and the research community with a suite of products that support forest level planning, inventory projection, timber supply analysis, and silviculture prescription development. These growth and yield tools will predict the development of even and uneven-aged, mixed species stands under a variety of silvicultural regimes, including partial cutting. In addition, managers will be able to evaluate forest health impacts of potential regimes at both the stand and landscape level. This funding will achieve the immediate goal of an operational model of South Eastern BC, and initiate preliminary work towards medium and long-term objectives. Industry support will be sought to supplement and/or provide funding for several medium and long-term development tasks.

Remaining goals:
- Complete revisions to mortality model
- Commence refit of all the component equations that comprise the model based on the BEC system rather than the US ecological system
- Enhance GUI
- Refine TSR application

Scheduled Completion: March 2002

Growth and Yield - Forest Productivity Council (99180)

Project Summary
The Forest Productivity Council of B.C., established in 1986, is an advisory body reporting to the Chief Forester on all matters related to growth and yield. Through the development of Five Year Plans, the Council outlines the programs and budgets necessary to implement comprehensive growth and yield programs on a provincial basis. This project provides for an expanded and enhanced Provincial Growth and Yield Program in response to increased activities in growth and yield provided by Forest Renewal BC funding. There are four components to this project:

A. Enhanced Council activities in support of FRBC proposal review;
B. Establishment of three regional growth and yield cooperatives;
C. Development of a new Provincial Permanent Sample Plot (PSP) Sampling Plan; and
D. Studies into Top Height.

Remaining goals:
- Maintenance of FPC technical advisory committee
- Develop provincial GY strategies
- Support working groups
- Facilitate new GY coops
- Undertake new FPC directed projects

Scheduled Completion: March 2002

Vegetation Resources Inventory Implementation (99270)

Project Summary
The Resources Inventory Program is responsible for developing and maintaining an inventory of vegetation on all the lands and forests in the province. Improving the quality and statistical rigor of these vegetation inventories are major priorities of the program.

The current inventory is based on the Unit Surveys completed in 1976. Most of the existing area and volume data were collected in these inventories. Since 1976, inventory activities have involved periodic updates and re-inventories, with re-classification of photos, but little or no ground sampling. Recent audits of the inventory have shown that the Unit Surveys produce reasonable estimates of population totals, however, there is no sampling frame nor any means of compiling the information to provide statistically reliable estimates of variance and associated statistics.

In 1991, the Forest Resources Commission recommended a complete re-design of how resource inventories are conducted. As a result a new inventory was designed by a group of inventory specialists and client representatives. The new design has been reviewed by an external review panel, approved by RIC, endorsed by the Chief Forester and now forms the standard for how resource inventories in the province are conducted.

Vegetation Resources Inventory provides information for: FPC planning; TSA management planning; TFL management planning; TSR analysis; Land and Resource Management Plans; and Wildlife habitat interpretations.

Remaining goals:
- Develop sample plans
- Data analysis
- Compiler adjustments
- Field testing
- Quality assurance

Scheduled Completion: March 2002

Permanent Sample Plots for Range Inventory (99280)

Project Summary
This project determines the potential composition and productivity of forested rangeland ecosystems in British Columbia. This project will serve as a baseline for understanding the interface between range and timber management by establishing permanent sample plots for Range Reference Areas (RRAs), in which livestock grazing is excluded, measuring vegetation within them, and developing descriptions of natural communities.

Private individuals, non-government organizations and government agencies have varied interests and lack of shared understanding of what can be accomplished on BC rangelands which has led to serious disagreements about land management practices. This problem is particularly severe in extensive forested and riparian range where poor management practices may result in severe overgrazing or infestation by alien weeds.

Remaining goals:
- Establish remaining critical range reference area sample plots; sample baseline information
- Sample previous years' establishments
- Prepare extension reports

Scheduled Completion: March 2002

Hydrometric Network (99510)

Project Summary:
This project provides the funds to support the operation of hydrometric stations which provide critical long-term, high quality hydrological data used to meet operational planning requirements (e.g., flow data for optimizing bridge and culvert design), forestry road regulations, flood and erosion impact assessment requirements, and watershed assessment procedures. This information consists of peak, annual, and low flows. Flow data must be collected for a minimum of 3 to 10 years to gather enough statistically sound information on which to base decisions. These stations are operated by Environment Canada under a federal - provincial cooperation agreement. Data are used to establish community watersheds and streams with high fish values and to support required watershed assessments.

The size and scope of the hydrometric network makes it useful as a baseline for estimating water quantity data where site specific inventories are not collected or where only short term data are available. Supporting these stations under the federal - provincial agreement is the most effective and efficient way to achieve FRBC priorities:

- operations follow a well established process with minimal overhead
- many of the stations are cost shared with the federal government thereby effectively doubling the purchasing power of the investment.

Remaining goals:
- Baseline hydrometric data collection

Scheduled Completion: March 2002

Business Planning and Coordination - MOF (99370)

Project Summary
The success of the proponent-led inventory projects in the Field Inventory Program requires government to fulfill its responsibilities in the areas of standards, data management, and quality assurance. In fulfilling this role, MOF will ensure that inventory information collected through projects funded by Forest Renewal BC will be useable and accessible, and will be accepted, and therefore of benefit to all interested partners. Business planning and coordination activities provide overall management and coordination for the planning and delivery of the infrastructure and provincial strategies required to ensure the success of the Field Inventory Program. The Business Planning and Coordination project ensures the completion of development of methods and standards for field inventories; development of training curricula for field inventories; development of databases for field inventory data storage and access; capture of existing datasets which reduce the need to conduct some field inventories.

Remaining goals:
- ensure deliverables from projects in Inventory Framework complete on time within budgets
- support development of strategies aimed at ensuring the greatest return on investment for inventory activities

Scheduled Completion: March 2002

Business Planning and Coordination - MELP (99370)

Project Summary
The success of the proponent-led inventory projects in the Field Inventory Program requires government to fulfill its responsibilities in the areas of standards, data management, and quality assurance. In fulfilling this role, MOF will ensure that inventory information collected through projects funded by Forest Renewal BC will be useable and accessible, and will be accepted, and therefore of benefit to all interested partners. Business planning and coordination activities provide overall management and coordination for the planning and delivery of the infrastructure and provincial strategies required to ensure the success of the Field Inventory Program. The Business Planning and Coordination project ensures the completion of development of methods and standards for field inventories; development of training curricula for field inventories; development of databases for field inventory data storage and access; capture of existing datasets which reduce the need to conduct some field inventories.

Remaining goals:
- ensure deliverables from projects in Inventory Framework complete on time within budgets
- support development of strategies aimed at ensuring the greatest return on investment for inventory activities

Scheduled Completion: March 2002

APPENDIX C - Framework Projects Completed by March 31, 1999

Watershed Atlas

HQ98-021

Project Summary
The Watershed Atlas is an intelligent digital stream/lake /wetland network with associated watershed boundaries and unique watershed/waterbody identifiers compiled from the federal 1:50,000 NTS map sheets. The Atlas is a primary base for the management, analysis and sharing of aquatic information in British Columbia. This project was completed in March 1998 and resulted in the creation of a digital base map of all aquatic features present on the approximately 1176 1:50,000 NTS maps covering the Province of BC.

Considerable summary statistics (numbers and areas of lakes and streams) have been generated and are available by watershed group, region and for entire Province. Watershed Atlas maps and documentation are available via ftp and the WWW.

Completed: March 1998

Archaeological Overview

HQ96-673

Project Summary
Archaeological overview assessments define the potential for an area to contain archaeological resources and result in predictions, usually mapped, regarding archaeological site variability, density and distribution. This project will upgrade archaeological overview maps completed in 9 forest districts from a 1:250,000 mapping scale to a scale more suitable for operational planning (1:20,000). The archaeological overview assessment is a resource management/planning tool which allows the forest district manager to make informed decisions about where archaeological impact assessments are required.

Completed: March 1998

Water Management Mapping Restructuring

(99630)

Project Summary
This project enabled forest development planning and implementation of the FPC by converting fundamental water supply spatial data from an unshareable paper format to a shareable digital format. This project will deliver TRIM-compatible spatial data showing water rights points of diversion, groundwater wells, Permits over Crown Land, community watersheds and other water features. Employing contracted conversion facilities, this project will convert existing Water Rights, Groundwater and Community Watershed maps from paper and mylar to digital GIS format and from multiple imperial and metric scales to consistent 1:20,000 TRIM format.
This project is an essential part of the Water Information Sharing project and constitutes the data conversion component of that project.

Scheduled Completion: March 1999

Watershed Atlas Data Capture

(99660)

Project Summary
This project proposal enhanced this existing intelligent base by adding additional aquatic features (streams, lakes, wetlands, etc.), required for fisheries/forestry purposes, with their associated watershed/waterbody identifiers. The resulting enhanced Atlas will be used as an interim base until the new TRIM Watershed Atlas becomes fully operational (likely within 2-4 years).
The 1:50,000 digital Watershed Atlas map base and associated identifier system are the foundation for the management, analysis and sharing of aquatic information in British Columbia. With the "attachment" of various aquatic-related information, this intelligent base provides the means to classify and describe the environmental values of this aspect of the forest land base. The Atlas with associated aquatic information will also indicate those geographic areas where new inventory is required to correct deficiencies in data collection.

Scheduled Completion: March 1999

Water Information Sharing Project (WINS)

(99460)

Project Summary
The project enhances the water inventory data management capabilities and accelerates access to water data by external clients such as forest licencees and MoF through the publication of a comprehensive water supply data set via the corporate data warehouse and LandData BC. It consists of the development of an information system of automated tools to enable the ongoing consistent data capture of water use location information. This is a continuing project and is linked to the Water Mapping Restructuring project.

Scheduled Completion: March 1999

Water Use Inventory Project

(HQ98-039)

Project Summary
The objective of this project is to groundtruth spatial and attribute water use data. The original focus was on spatial data, the primary purpose has changed to attribute data on water use. This change has been made in consultation with forest licencees and District MoF staff. The project will deliver updated and accurate information on licensed (and to a minor degree unlicensed) water use. This will include the amendment, cancellation or partial cancellation of water licenses which are not or only partially beneficially used. On the spatial side, GPS technology will be used to accurately capture existing points of diversion, works and other water use points of interest. This project is closely associated with the WINS project and the updated water use data will be based in WINS, and will be easily retrievable by external clients. Some of the spatial groundtruthing will be required as a result of expected discrepancies between water rights maps and the digital TRIM base, revealed by our other map conversion project.

Completed: March 1998

Water Quality Data Acceleration

(HQ96-655)

Project Summary
The goal of this project is to compile existing physical, chemical and biological data associated with changes in water quality related to forestry activities such as increased sediment transfer and changes in hydrology. This project compliments the needs analyses being conducted by each region in which existing data and data gaps are being identified. Funds from the Data Acceleration Project are used to compile data identified through the regional needs analyses and other sources for use in the water quality inventory program.

Completed: March 1998

Recreation Inventory Data Model

(HQ96-675)

Project Summary
This project is part of the larger Recreation Resources Inventory Project. The overall purpose of the project is to develop and implement standards, management processes and operational practices to provide and maintain an accessible, accurate recreation resources inventory for all the lands of the province.

The functional data modeling component is an existing/expansion of preliminary work undertaken by RIC in 1994 to develop a logical data model for all resource inventories approved by the Committee. Data modeling is a critical step in enabling the inventory data to be defined, identified, collected, maintained and used in a standard and consistent format and to be included in the corporate land database for use by all ministries, agencies, industries and the public. Additional software development of data entry screens, labeling software and linkages to external databases is required to make this a functional tool.

Completed: March 1998

Soils Database Development

(99240)

Project Summary
The project will implement the BC - Soils Information Management Plan (BC-SIMP), which is to develop a provincial soils information system that will support the soils data needs for managing our provincial resources. This project will provide a delivery 'mechanism' for providing soils information in a manner that will enable better and responsible management of our provincial resources.

Completed: March 1998

Vegetation Inventory Curriculum Development

(HQ96-680)

Project Summary
The need for rapid, consistent implementation of improved resource inventories has been intensified with the implementation of the Forest Practices Code and the Forest Renewal Program. The Resources Inventory Committee (RIC) Training Program exists to support the implementation of the approximately 110 resources inventory standards currently being developed.
This project was identified under the Curriculum Development project but was separated out into its own project due to the speed of implementation and ease of accounting.

Completed: March 1998

Vegetation Inventory Standards and Procedures Development

(HQ96-679)

Project Summary
The Resources Inventory Program within the Ministry of Forests is responsible for the inventory of vegetation on all lands in the province. To facilitate this, a process is being implemented which is a photo-based, two-phased inventory incorporating and estimating a range of timber, ecological and mensuration data. There are two major objectives of this new vegetation inventory: the first is to determine how much of a given characteristic or attribute is within the province; the second is to determine the physical location of these attributes.

Completed: March 1998

Old-growth Site Index Adjustment Project

(HQ96-677)

Project Summary
The Old-growth Site Index Adjustment (OGSI) project, initiated in 1994, will improve estimates of site index for priority species in old-growth stands. The OGSI project is led by the Site Productivity Working Group (SPWG), a joint government, industry, and academic research effort funded largely by Forest Renewal B.C. The goal of the SPWG is develop site productivity estimation techniques that will provide the means to accurately estimate the productivity of any forest stand in British Columbia.

Site productivity can be defined as the inherent capability of land to produce wood volume of a specified species. It can be expressed by such tools as site index, growth intercepts, plant indicators, and soil-site relationships. Site index, which is the height of a forest stand fifty years after the trees reach breast height, is commonly used to estimate site productivity in B.C. However, estimating site productivity is especially difficult on existing old-growth stands, juvenile stands, uneven-aged stands, and on sites where there is no standing timber. Many foresters believe that our existing site index tools frequently underestimate site productivity when used on mature or recently logged stands.

Completed: March 1998

Survey Methods for Operational Adjustment Factors in TIPSY

(PA96-247)

Project Summary

Uncertainty around appropriate Type 1 Operational Adjustment Factors (OAF1) values, and the absence of a method to survey to estimate OAF1s, are perhaps the largest area of uncertainty in TIPSY yield projections. This project will 1) refine the ground-based OAF1 survey procedure developed in 1996/97; 2) estimate OAF1 for a larger sample of stands; 3) develop a method to predict OAF1 from easily observable stand and site predictions; and 4) evaluate alternative methods to estimate OAF1.

OAF1 is used to reduce the volume predictions of the Ministry of Forests' growth and yield model TIPSY. The OAF1 is used to reduce predicted volume to account for unstocked gaps in forest stands. For most timber supply analyses and silviculture investment analyses, an OAF1 of 15% has been used, though forest resource managers have had no way to determine if this number was appropriate for their local forest conditions. Preliminary results from this project in 1996/97 suggest that unstocked gaps in regenerated stands may have much less of an impact on volume than expected. In the existing small sample of regenerated stands, an OAF1 of 15% appears to be much too high.

Completed: March 1998

Draft Inventory Framework Component
of the Resource Management Plan – Sept. 99

In December 1998 documents were delivered to Forest Renewal BC which provided a review of the Framework Inventory program to March 31, 1999. For reference this document; Inventory Framework - Program Review and Request for Fiscal Year 1999/00; is attached.
This document; Draft Inventory Framework Component of the Resource Management Plan – Sept. 99; presents:

- confirmation of what will be completed by March 2000
- an outline of what will be continuing in 2001/02, including activities to be completed by March 2001
- presents new work for 2000/01 specifically related to Forest Renewal's Strategic Objective 3 – Strengthening Sustainable Forest Management
- an overview of fiscal year 2001/02
- and an introduction of continuing needs

Work on the Inventory Framework initiative of the Forest Renewal BC Resources Inventory Program is continuing toward its original objectives of providing the foundation needed to support field inventory work. The various components of the Inventory Framework Program are needed to support field inventories regardless of intensity, scale or extent, as these inventories provide information for business needs ranging from operational to strategic.

Needs identified to meet Forest Renewal's new strategic objectives will require some additional projects. These include provincial program strategies as well as work on decision support and monitoring tools which are needed in implementing strategic plans and in supporting strategic decision making (eg. AAC determination).

The detailed funding requirements have been left at the component level for 2000/01, pending identification of further requirements which may flow from the Resource Management Plans.

In addition, priority activities which may not have a clear funding source have been included for completeness.

e.g. Database maintenance, TUS

DRAFT

October 1, 1999

Inventory Framework Components	1999/00 $	2000/01 $	2001/02 $	2002... $
Existing/Continuing Projects				
Data Capture and Conversion	3,177,272	2,465,000	2,120,000	
Database Development	1,347,618	870,000	60,000	
Standards and Curriculum Development	434,493	428,000	70,000	
Provincial Program Strategies	2,835,769	4,439,000	3,349,000	
Subtotal	7,795,152	8,202,000	5,599,000	
TUS	2,372,480	529,000		
Resource Management Plan Issues				
Additions				
Database maintenance	0	tbd	tbd	
Traditional Use Studies	0	545,066	799,451	
Total	10,167,632	9,276,066	6,398,451	0

99/00 $ include those projects that finish March 31 2000